ASF SAR Processing System Capabilities & Performance†

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The Alaska SAR Facility (ASF) is a National Aeronautics and Space Administration (NASA) funded Data Acquisition and Archive Center (DAAC) maintained and operated by the University of Alaska Fairbanks (UAF). Its unique high latitude location provides excellent coverage over a large portion of the Arctic region for polar orbiting remote sensing satellites. Since its commissioning in 1989, ASF has been going through continuous upgrades to accommodate virtually all civilian synthetic aperture radar (SAR) satellites including ERS-1 and ERS-2 from ESA (European Space Agency), JERS-1 from NASDA (Nippon Aeronautics and Space Development Agency), and Radarsat from CSA (Canadian Space Agency). ASF has also updated its data acquisition, processing, archive as well as distribution capabilities to serve the international science community. In particular, the SAR Processing System (SPS) of ASF is completing its most recent upgrade to produce a wide variety of new product types for Radarsat involving the continuous beam modes, the ScanSAR modes, as well as the left-looking data collected for the Antarctic Mapping Mission (AMM).

The ASF SPS has evolved from a single custom-built hardware SAR processor (ASP) dedicated to processing ERS-1 data to a high performance system consisting of three SAR processors (ASP, a ScanSAR Processor named SSP, and a Precision Processor named PP) hosted on four IBM (International Business Machine Corporation) SP2 platforms, a raw data scanner/decoder hosted on two SGI (Silicon Graphics Incorporated) Challenge platforms, and a control processor hosted on an SGI Origin 200 platform. The SPS can currently generate over 20 different image products from various modes of data from ERS-1/2, JERS-1, and Radarsat; including high and low resolution products, complex products, geocoded products, as well as a specialized product for left-looking data collected by Radarsat during AMM. The SPS throughput has more than doubled from the original 60 minutes of data processed per day to the current capability of over 123 minutes a day. The SPS processor architecture has also gone from dedicated custom hardware to more flexible software implementation on COTS (commercial-off-the-shelf) platforms, thereby allowing easy incorporation of the latest in SAR processing algorithms.

This paper describes the current ASF SAR Processing System; with specific emphasis on the capabilities and performance of each of the SAR processors in terms of types of products supported, image product quality, and processing throughput. Near-term plan to enhance the capability of the new software processors on COTS with additional product types and throughput is discussed. In addition, a host of ASF SPS enhancements and development planned toward the year 2000 is also outlined.

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